~~direction and 3.16x10^{-5} in/in °F in both the Y and Z directions. (Hence, the relevant~~ CLTEs for purposes of defining the invention are 1.09 x 10^{-5} in/in °F ~~and 1.28~~ x 10^{-5} in/in °F.) Another similar material, Konduit PDX –0-988, was found to have a CLTE in the range of –30 to 30°C of 1.1x10^{-5} in/in °F in the X direction and 1.46x10^{-5} in/in °F in both the Y and Z directions, and a CLTE in the range of 100 to 240°C of 1.16x10^{-5} in/in °F in the X direction and 3.4x10^{-5} in/in °F in both the Y and Z directions. By contrast, a PBS type polymer, (Fortron 4665) was likewise tested. While it had a low CLTE in the range of –30 to 30°C (1.05x10^{-5} in/in °F in the X direction and 1.33x10^{-5} in/in °F in both the Y and Z directions), it had a much higher CLTE in the range of 100 to 240°C (1.94x10^{-5} ~~in/in °F in the X direction and 4.17x10^{-5} in/in °F in both the Y and Z directions).~~

a2 cont. In5' B' concl'd.

IN THE CLAIMS

Please rewrite claims 1, ~~11–12 and 14~~ and 12-14 as follows without prejudice.

SUB B2 cont.

a3

1. (Amended) A high speed spindle motor for a disc drive comprising:

a) a shaft having a rotational axis ;

b) a disc support member attached to the shaft and including a permanent magnet;

c) a bearing allowing rotation of the disc support member about the rotational axis of the shaft;

d) a stator; and

e) a monolithically formed body that substantially encapsulates the stator, wherein a thermoplastic material is injection molded to form the body and the body is configured to align the shaft, disc support member and bearing with respect to one another.

SUB B2 cont.

a4

12. (Amended) The high speed motor of claim 11 wherein the second magnet is an enhancement magnet.

13. (Amended) The high speed motor of claim 11 wherein the second magnet is part of a magnetic bearing.

14. (Amended) A high speed spindle motor for a disc drive comprising:

a) a shaft;

a4 cont. SUB B2 concl'd.

b) a disc support member attached to the shaft;

c) a bearing disposed around the shaft;

d) a stator; and

e) a monolithically formed body that substantially encapsulates the stator, the monolithically formed body surrounding the bearings and the shaft, the body being formed by injection molding and being made of a material having a coefficient of linear thermal expansion of less than 2×10^{-5} in/in/°F throughout the range of 0-250°F.

Please add new claims 20-44 as follows:

SUB B4 cont.

20. (New) A high speed spindle motor for a disc drive comprising:

a) a shaft;

b) a disc support member attached to the shaft and including a permanent magnet;

c) a bearing surrounding the shaft;

d) a stator; and

e) a monolithically formed body that substantially encapsulates the stator, wherein a thermoplastic material is injection molded to form the body, the material has a coefficient of thermal conductivity of at least 0.7 watts/meter°K at 23°C and the body is configured to align the shaft, disc support member and bearing with respect to one another.

a5

21. (New) The high speed motor of claim 1 wherein the bearing is fixed to the body.

22. (New) The high speed motor of claim 1 wherein the shaft is fixed to the disc support member.

23. (New) The high speed motor of claim 1 wherein the stator further comprises a core and conductors that induce magnetic fields in the core when current is conducted by the conductors.

24. (New) The high speed motor of claim 23 wherein the core comprises steel laminations.

SUB B4 cont.

25. (New) The high speed motor of claim 23 wherein the core has a plurality of poles and the conductors comprise windings around said poles.

26. (New) The high speed motor of claim 1 wherein the bearing comprises ball bearings.

27. (New) The high speed motor of claim 26 wherein the bearings comprise oversized bearings having an outer diameter of over 13 mm.

28. (New) The high speed motor of claim 1 wherein the bearing is a hydrodynamic bearing.

29. (New) The high speed motor of claim 1 wherein the motor is able to operate at at least 10,000 rpm.

A5 Cont.

30. (New) The high speed motor of claim 8 wherein the insert provides structural rigidity to the body.

31. (New) The high speed motor of claim 8 wherein the insert enhances heat transfer away from the bearing and the stator.

32. (New) The high speed motor of claim 1 wherein a first portion of a magnetic bearing is substantially encapsulated within the body and a second opposing portion of the magnetic bearing is attached to the disc support member.

33. (New) The high speed motor of claim 32 wherein the body has been machined to provide precise tolerance between the first and second portions of the magnetic bearing.

34. (New) The high speed motor of claim 8 wherein the insert enhances dampening of motor vibration.

35. (New) The high speed motor of claim 8 wherein the insert enhances dampening of audible noise.

Sub. B4 concl'd.

36. (New) The high speed motor of claim 8 wherein the shaft is fixed to the body and the insert is positioned between the shaft and the bearing.

37. (New) The high speed motor of claim 1 wherein the thermoplastic material includes ceramic particles.

a5 cont.

38. (New) The high speed motor of claim 1 wherein the thermoplastic material has a coefficient of linear thermal expansion of less than $2x10^{-5}$ in/in/°F throughout the range of 0-250°F.

39. (New) The high speed motor of claim 1 wherein the thermoplastic material has a coefficient of linear thermal expansion of less than $1.5x10^{-5}$ in/in/°F throughout the range of 0-250°F.

40. (New) The high speed motor of claim 1 wherein the thermoplastic material has a coefficient of linear thermal expansion of between about $0.8x10^{-5}$ in/in/°F and about $1.2x10^{-5}$ in/in/°F throughout the range of 0-250°F.

41. (New) The high speed motor of claim 1 wherein the bearing comprises steel, the disc support member comprising aluminum and the thermoplastic material has a coefficient of linear thermal expansion that is between the coefficient of linear thermal expansion of the steel and the coefficient of linear thermal expansion of the aluminum.

42. (New) The high speed motor of claim 1 wherein the thermoplastic material comprises polyphenyl sulfide.

43. (New) The high speed motor of claim 1 wherein the shaft is fixed to the thermoplastic body by being molded with the stator in the thermoplastic body.

44. (New) The high speed motor of claim 1 wherein the bearing is fixed to the thermoplastic body with a press fit.

REMARKS

The amendment does not involve new matter. The changes to the specification and amended claims from the previous version to the rewritten version are shown in

Appendix A, with brackets for deleted matter and underlines for added matter. The Abstract was amended to delete phrases objected to in the Office Action. Pages 27-28 were amended to use the term "in/in °F" for the units of the coefficient of linear thermal expansion. Those same units are used in the claims. The change was made because the way the units for CLTE were originally expressed in another application of Applicant pending with the same Examiner was objected to. New claim 20 is patterned after claim 1. New claims 21-44 are dependent on claim 1 and are fully supported by the specification.

Examiner Waks is thanked for the courtesy of the personal interview with the Applicant and his attorney on June 27, 2001. In addition to the information contained in the Examiner's Interview Summary, the following is noted.

Applicant showed exhibits of several stator assemblies and motors made according to the present invention. Applicant also showed a graph of the thermal conductivity of various materials, including the Konduit material described on page 28 of the specification. While claim 1was discussed specifically, other claims and possible new claim language was discussed generally. In addition to U.S. Patent No. 5,942,824 (Shioya), U.S. Patent No. 5,783,888 (Yamano) was also discussed. No specific amendment was presented. The thrusts of the principle arguments presented are included in the remarks below. No agreement was reached.

The Office Action notes that numerous references have been cited in supplemental information disclosure statements, and takes the position that a large volume of the cited prior art is not material and may obscure a single material reference. As explained during the interview, Applicant has filed a number of applications that are closely related. To avoid an argument by an infringer that the patent is invalid because prior art from related applications was not brought to the attention of the Examiner in this case, it is Applicant's intention to try to make all references cited in each of the related case of record in the other cases. If the Examiner feels inundated, Applicant can at least assure the Examiner that there is no effort to obscure any reference. The Examiner must appreciate that under the Duty of Candor, and the likelihood of an infringer raising a defense of invalidity based on an alleged breach of that duty, it is wise for Applicant to cite all of the prior art from related cases. Applicant has complied with the duty, and the rules for proper submission of references. It is expected that the

Examiner will follow Patent and Trademark Office procedure and review the references and make them of record. Applicant's attorney is not aware of any policy that allows an Examiner to simply not review and make of record correctly cited references because of their large number. However, if the Examiner has questions or would like to discuss the matter further he is invited to telephone Applicant's attorney.

Claims 1-4, 6, 10 and 14-16 were rejected in the outstanding Office Action under 35 U.S.C. §102(b) as being anticipated by Yamano. This rejection is respectfully traversed. Claims 1 and 14 are directed to a high speed spindle motor for a disc drive. The claims each require a motor with a stator, a shaft, a bearing, a disc support member and a monolithically formed body that substantially encapsulates the stator, wherein a thermoplastic material is injection molded to form the body. Page 8 of the specification uses the following text to define substantial encapsulation: "Substantial encapsulation means that the body 14 either entirely surrounds the stator 20, or surrounds almost all of it except for minor areas of the stator that may be exposed. However, substantial encapsulation means that the body 14 and stator 20 are rigidly fixed together, and behave as a single component with respect to harmonic oscillation vibration."

Yamano discloses a rotary electric machine. The patent is concerned with reducing the axial length of a motor where a fan is attached to the motor shaft. There is no suggestion in Yamano of using the motor for a disc drive, or attaching a disc support member to the shaft. While the Abstract refers to molding a synthetic resin member 7 to the periphery of the stator, there is no disclosure of injection molding, as now required by claims 1 and 14. Claims 1 and 14, and claims 2-4, 6, 10 and 15-16 dependent thereon, are therefore not anticipated by Yamano.

Claims 1, 3, 5-8, 11-15 and 17-19 were rejected in the outstanding Office Action under 35 U.S.C. §102(e) as being anticipated by Shioya. This rejection is also respectfully traversed. Shioya discloses a motor and method of manufacturing the same. The Office Action takes the position that the embodiment of Fig. 7 of Shioya discloses a monolithically formed body 126, 124 substantially encapsulating the stator 60 and substantially encapsulating an insert 72. As discussed during the interview, while Shioya does suggest that the base portion 122, pedestal portion 124 and holder portion 126 are integrally formed, there is no suggestion that the drive coils 70 are

encapsulated in that piece. The drawings do not show any plastic material substantially surrounding the drive coils.

The Office Action refers to the "stator 60." However, reference number 60 of Shioya refers to the entire stator assembly, made up of all of the base 61, shaft 62, circuit board 68 etc. If the term "stator" in the present claims were interpreted to include all of these components, then the stator would not be substantially encapsulated, as required by the claims. The coils 70 are definitely part of the stator, as that term would be interpreted in light of the present specification. The yoke 72 may also be considered as part of the stator, although the Office Action seems to refer to the yoke as constituting the insert specified in claim 8. In any event, the yoke 72 is not substantially encapsulated either. In fact column 15, line 6 states that a shallow groove 74 is formed in the base 61of Fig. 1, which groove is used to accommodate the yoke. Fig. 7 is identical to Fig. 1 in this regard. If the yoke were encapsulated by being injection molded into the base, there would be no groove formed first. Moreover, the materials used to make the yoke 72 (iron or steel, since it directs magnetic lines of force generated in the drive coils) and the base 122 (a nylon material with a ferritic magnetic material mixed in (Col. 18 lines 36-39)) are such that the yoke would not be encapsulated by being injection molded with the base. The materials have such different shrinkage rates that the base would crack if the yoke were already in place and the base molded around it. In addition, the nylon/ferritic material is used to form the stator-side thrust magnet portion 128 by direct polarization (Col. 18 line 44-46). It would not be desirable to try to magnetize this portion of the integral base, pedestal portion and holder portion while a steel or iron yoke was in place. Thus Shioya does not disclose injection molding a body that substantially encapsulates a stator as required by claims 1 and 14. Claims 3, 5-8, 11-13, 15 and 17-19 are dependent on claims 1 and 14 and are therefore also not anticipated by Shioya.

In addition, claim 6 requires a shaft that is freely rotatable relative to the body, which is not found in Fig. 7 of Shioya. The Office Action refers to Fig. 16 as showing this feature, but Fig. 16 does not show all of the other elements of claim 1 on which claim 6 depends.

The Office Action refers to reference number 85 being a second magnet, part of a magnetic bearing. 85 is an intermediate line between the North and South poles of

stator-side thrust magnet. In any event, this does not constitute a second magnet encapsulated within the body as required by claims 11-13 and 18.

Claims 9 and 10 were rejected in the outstanding Office Action under 35 U.S.C. §103(a) as being unpatentable over Shioya in view of U.S. Patent No. 6,043,583 (Kurosawa). This rejection is respectfully traversed. As noted above, Shioya does not disclose a stator substantially encapsulated in an injection molded body. Kurosawa does not disclose injection molding a body to substantially encapsulate a stator. Therefore the combination of Shioya and Kurosawa does not disclose the elements of claim 1, nor of claims 9 and 10 dependent thereon.

Claim 14 and 20 further distinguish over the prior art by specifying a coefficient of linear thermal expansion and coefficient of thermal conductivity that are not disclosed in the cited prior art. The new dependent claims also disclose a number of features in the preferred embodiment of the invention that are not found in the cited prior art.

Since each of the rejections have been overcome, the case is in condition for allowance. An early notice to that effect is respectfully requested.

Respectfully submitted,

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